PMA16108 MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS 3 2 0 4

COURSE OBJECTIVES

To enable the students to

- understand the concepts and operations of matrix algebra needed for computing graphics modelling
- understand and apply the class of functions which transform a finite set into another finite set which relates to input output functions in computer science
- make the students to think logically and mathematically and apply these techniques in solving problems
- impart discrete knowledge in computer engineering through finite automata
- impart discrete knowledge in computer engineering through Context free Grammars

UNIT I MATRIX ALGEBRA 15

Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

UNIT II BASIC SET THEORY 15

Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, subjective and objective functions.

UNIT III MATHEMATICAL LOGIC 15

Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus.

UNIT IV FORMAL LANGUAGES 15

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma for Regular Languages-Context Free Languages.

UNIT V FINITE STATE AUTOMATA 15

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)- Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages

TOTAL PERIODS 45+30 75

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic knowledge of matrix, set theory, functions and relations concepts needed for designing and solving problems
- perform the knowledge of logical operations and predicate calculus needed for computing skill
- design and solve Boolean functions for defined problems
- apply the acquired knowledge of formal languages to the engineering areas like compiler design
- apply the acquired knowledge of finite automata theory and design discrete problems to solve by computers

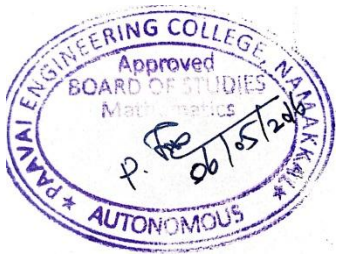
REFERENCES

1. Kenneth H.Rosen, “Discrete Mathematics and its Applications”, 6th Edition, Tata McGraw-Hill, 5th Reprint 2013.
2. Hopcroft and Ullman, “Introduction to Automata Theory, Languages and Computation”, Narosa Publishing House, Delhi, 2012.
3. Trembly J.P and Manohar.R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw-Hill, 35th Reprint 2013.
4. Sakthivel” Mathematical Foundations Of Computer Science” A.R.S Publications First Edition 2012.
5. A.Tamilarasi & A.M.Natarajan, “Discrete Mathematics and its Application”, Khanna Publishers, 2nd Edition 2014.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3



CA16101 COMPUTER ORGANIZATION 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- impart the knowledge in the field of digital electronics
- impart knowledge about the various components of a computer and its internals
- design and realize the functionality of the computer hardware with basic gate
- design other components using combinational and sequential logic
- understand the importance of the hardware-software interface

UNIT I DIGITAL FUNDAMENTALS 9

Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS 9

Design of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering **–** Master – Slave Flip Flop – State Diagram and Minimization –Counters – Registers.

UNIT III BASIC STRUCTURE OF COMPUTERS & PARALLEL PROCESSING 9

Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Addressing modes – ALU design – Fixed point and Floating point operation.

UNIT IV PROCESSOR DESIGN 9

Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – Super scalar operation.

UNIT V MEMORY, I/O SYSTEM AND PARALLEL PROCESSING 9

Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces - Multiprocessor Organization – Symmetric multiprocessors – Cache Coherence – Clusters: Non Uniform Memory Access - Vector Computation.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- design digital circuits by simplifying the Boolean functions
- understand the organization and working principle of computer hardware components
- acquire knowledge about multiprocessor organization and parallel processing
- trace the execution sequence of an instruction through the processor
- design digital circuits by simplifying the Boolean functions

REFERENCES

1. Morris Mano, “Digital Design”, Prentice Hall of India, Fourth Edition 2012.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, “Computer organization and Embedded Systems”, Sixth Edition, Tata McGraw Hill, 2012.
3. William Stallings, “Computer Organization & Architecture – Designing for Performance” 9th Edition 2013.
4. Charles H. Roth, Jr., “Fundamentals of Logic Design”, Jaico Publishing House, Mumbai, Fourth Edition, 2013.
5. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Morgan Kaufmann / Elsevier, 2012.

Mapping of Courses Outcomes with Programme Outcomes:
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	3	2	3

CA16102 PROBLEM SOLVING TECHNIQUES 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- impart the knowledge in the field of digital electronics
- impart knowledge about the various components of a computer and its internals
- design other components using combinational and sequential logic
- understand the importance of the hardware-software interface
- impart the knowledge in the field of digital electronics

UNIT I DIGITAL FUNDAMENTALS 9

Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS 9

Design of Combinational Circuits – Adder / Subtracter – Encoder – Decoder – MUX / DEMUX – Comparators Flops – Triggering **–** Master – Slave Flip Flop – State Diagram and Minimization –Counters – Registers.

UNIT III BASIC STRUCTURE OF COMPUTERS & PARALLEL PROCESSING 9

Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Addressing modes – ALU design – Fixed point and Floating point operation.

UNIT IV PROCESSOR DESIGN 9

Processor basics – CPU Organization – Data path design – Control design – Basic concepts – Hard wired control – Micro programmed control – Pipeline control – Hazards – Super scalar operation.

UNIT V MEMORY, I/O SYSTEM AND PARALLEL PROCESSING 9

Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/output system – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces – Multiprocessor Organization – Symmetric multiprocessors – Cache Coherence – Clusters: Non Uniform Memory Access - Vector Computation.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- design digital circuits by simplifying the Boolean functions
- understand the organization and working principle of computer hardware components
- understand mapping between virtual and physical memory
- acquire knowledge about multiprocessor organization and parallel processing
- trace the execution sequence of an instruction through the processor

REFERENCES

1. Morris Mano, “Digital Design”, Prentice Hall of India, Fourth Edition 2012.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, “Computer organization and Embedded Systems”, Sixth Edition, Tata McGraw Hill, 2012.
3. William Stallings, “Computer Organization & Architecture – Designing for Performance” 9th Edition 2013.
4. Charles H. Roth, Jr., “Fundamentals of Logic Design”, Jaico Publishing House, Mumbai, Fourth Edition, 2013.
5. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Fourth Edition, Morgan Kaufmann / Elsevier, 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	1	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	2
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	2	2	3

CA16103 PROGRAMMING IN C 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of basic programming concept
- know about data storage techniques a query processing
- understand the fundamentals of structures
- understand the fundamentals of file management systems
- understand the fundamentals of basic programming concept

UNIT I INTRODUCTION TO C LANGUAGE 9

Overview of 'C' language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making - Branching - IF, Nested IF - Switch – go to - Looping- While, do, for statements.

UNIT II ARRAYS AND FUNCTIONS 9

Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - String handling Functions – User defined Functions - Categories of Functions - Recursion.

UNIT III STRUCTURES AND UNIONS 9

Basics of Structures-Declaring a Structure - Array of Structures -Passing Structures elements to Functions- Passing entire Structure to Function - Structures within Structures - Union - Union of Structures - Enumerated Data Types – typedef Statement.

UNIT IV POINTERS 9

Pointers - Declaration, Accessing a variable, dynamic memory allocation, Pointers versus Arrays, Array of pointers, Pointers to functions and structure Pointers.

UNIT V FILE MANAGEMENT 9

File Management in C - Data hierarchy- Files and Streams - Sequential access file- Random access file - Preprocessors

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the programs
- design a program using C functions and structures
- acquire the knowledge of pointer to monitor the performance of the C language
- develop a simple applications using file manipulation
- develop a simple applications using structures

REFERENCES

1. Byron C Gottried, “Programming with C”, Schuams outline series, 2nd edition, Tata McGraw Hill, 2013.
2. Yashavant P. Kanetkar “Understanding Pointers In C” , BPB Publications, New Delhi, 2012.
3. Reema Thareja, “Programming in C”, Oxford University Press, 2012.
4. Kamthane, “Programming with ANSI and Turbo C”, Pearson Education, Delhi 2013.
5. E. Balagurusamy “ Programming in ANSI C ” , Tata McGraw Hill, 2013.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	1	3	2	2	-	-	-	-		2	1	2	1
CO4	1	2	3	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	2	2	-	-	-	2	-	-	-	2	1	3

CA16104 DATA STRUCTURES AND ALGORITHMS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the linear and non linear data structures available in solving problems
- know about the sorting and searching techniques and its efficiencies
- get a clear idea about the various algorithm design techniques
- using the data structures and algorithms in real time applications
- analyze the efficiency of algorithm

UNIT I LINEAR DATA STRUCTURES 9

Introduction - Abstract Data Types (ADT) – Arrays and its representation –Structures – Stack – Queue – Circular Queue - Applications of stack – Infix to postfix conversion – evaluation of expression – Applications of Queue - Linked Lists – Doubly Linked lists – Applications of linked list – Polynomial Addition

UNIT II TREE STRUCTURES 9

Need for non-linear structures – Trees and its representation – Binary Tree – expression trees – Binary tree Traversals – left child right sibling data structures for general trees – applications of trees – Huffman Algorithm - Binary search tree.

UNIT III BALANCED SEARCH TREES, SORTING AND INDEXING 9

AVL trees–B-Trees-Sorting–Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing - Hashing functions- Collision Resolution Techniques - Separate chaining - Open addressing - Multiple hashing.

UNIT IV GRAPHS 9

Definitions – Representation of graph - Graph Traversals - Depth-first traversal – breadth-first traversal - applications of graphs - Topological sort – shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – biconnectivity – Euler circuits.

UNIT V ALGORITHM DESIGN AND ANALYSIS 9

Algorithm Analysis – Asymptotic Notations - Divide and Conquer – Merge Sort – Binary Search - Greedy Algorithms – Knapsack Problem – Dynamic Programming – Warshall's Algorithm for Finding Transitive Closure – Backtracking – Sum of Subset Problem – Branch and Bound – Travelling Salesman Problem.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- select and apply the data structure to suit any given problem
- design their own data structure according to the application need
- apply the algorithm design techniques to any of the real world problem
- develop any new application with the help of data structures and algorithms
- write efficient algorithm for a given problem and able to analyze its time complexity

REFERENCES

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education Asia, 2013.
2. Tanaenbaum A.S.,Langram Y. Augestein M.J “ Data Structures using C” Pearson Education , 2012
3. Anany Levitin “Introduction to the Design and Analysis of Algorithms” Pearson Education 2013.
4. E. Horowitz, S.Sahni and Dinesh Mehta, “Fundamentals of Data structures in C++”, University Press, 2013.
5. Reema Thareja, “Data Structures using C”, Oxford Press, 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	1	2	2	-	-	-	-		2	2	2	2
CO4	2	1	2	2	-	-	-	1	-	-	-	-	2	2
CO5	1	1	3	2	-	-	-	2	-	-	-	1	1	3

CA16105 PROGRAMMING IN C LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of structures.
- understand the fundamentals of file management systems.

1. Display the following:
   (i) Floyd's triangle (ii) Pascal Triangle
2. Generate the following series of numbers:
   (i) Armstrong numbers between 1 to 100
   (ii) Prime numbers between 1 to 50
   (iii) Fibonacci series up to N numbers
3. Manipulate the strings with following operations.
   (i) Concatenating two strings
   (ii) Reversing the string
   (iii) Finding the substring
   (iv) Replacing a string
   (v) Finding length of the string
4. Find the summation of the following series:
   (i) Sine (ii) Cosine (iii) Exponential
5. Simulate following Banking operations using functions.
   (i) Deposit (ii) Withdrawal (iii) Balance Enquiry
6. Implement using recursion
   (i) Fibonacci number generation. (ii) Factorial
7. Generate Student mark sheets using structures.
8. Create a collection of books using arrays of structures and do the following:
   (i) Search a book with title and author name (ii) Sorts the books on title.
9. Perform string operations using pointers.
10. Program to implement dynamic memory allocation. Creating, Reading and displaying a sequential and random access file.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the programs
- design a program using C functions and structures

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

CA16106 DATA STRUCTURES AND ALGORITHMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- using the data structures and algorithms in real time applications
- able to analyze the efficiency of algorithm

1. Polynomial Addition using array
2. Array implementation of stack
3. Array implementation of Queue
4. Infix to postfix conversion
5. Singly Linked List operations
6. Binary tree traversals
7. Quick sort
8. Dictionary application using any of the data structure
9. Find the Shortest Path using Dijkstra's Algorithm – Greedy method
10. Warshall's Algorithm for finding transitive closure using Dynamic programming
11. Sum of subset problem using backtracking

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- develop any new application with the help of data structures and algorithms
- write efficient algorithm for a given problem and able to analyze its time complexity to apply

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	-	-	-	-	2	2	2
CO2	1	2	3	3	2	-	-	-	-	-	-	2	2	1

CA16107 **OFFICE AUTOMATION LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- understand MS-Office concept
- get a clear idea about the various design techniques

MS-WORD

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Text Formatting
5. Picture Insertion and Alignment
6. Creation of Documents Using Templates
7. Creation of Templates
8. Mail Merge Concept
9. Copying Text and Picture From Excel
10. Creation of Tables, Formatting Tables
11. Splitting the Screen
12. Opening Multiple Document, Inserting Symbols in Documents

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning, Editing Data in Cell
3. Excel Function (Date, Time, Statistical, Mathematical, Financial Functions)
4. Changing of Column Width and Row Height (Column and Range of Column)
5. Moving, copying, Inserting and Deleting Rows and Columns
6. Formatting Numbers and Other Numeric Formats
7. Drawing Borders around Cells 8. Creation of Charts Raising Moving
8. Changing Chart Type
9. Controlling the Appearance of a Chart

MS-POWER POINT (Working With Slides)

1. Creating, saving, closing presentation
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clipart
6. Run and Slide Show

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- design own data according to the application need
- develop any new document with the help of MS office

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

CA16201 OBJECT ORIENTED PROGRAMMING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- learn how C++ supports Object Oriented principles such as abstraction, polymorphism etc
- understand and apply the principles hiding, localization and modularity in software development
- use the generic programming features of C++ including the STL
- design and implement reliable and maintainable object-oriented applications
- design and moderate complexity composed of several classes

UNIT I FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING 9

Object Oriented Programming concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types –– Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call–by–Reference – Assertions – Standard template library.

UNIT II IMPLEMENTING ADTS AND ENCAPSULATION 9

Aggregate Type struct–Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – reference semantics – implementation of simple ADTs.

UNIT III POLYMORPHISM 9

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators – Visitation – Iterators – containers – Sequence Containers - List – List Iterators – Associative Containers.

UNIT IV TEMPLATESAND FILE HANDLING 9

Template Class–Function Templates – RTTI Templates - Class Templates – Parameterizing – STL – Algorithms – Function Adaptors – Streams and Formatted I/O – I/O Manipulations -File handling – Random Access

UNIT V INHERITANCE 9

Derived Class– Typing Conversions and Visibility – Code Reuse – Virtual Functions – Templates and Inheritance – Run–Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand and design the solution to a problem using object-oriented programming concepts
- use proper class protection mechanism to provide security
- demonstrate the use of virtual functions to implement polymorphism
- understand and implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems
- reuse the code with extensible Class types, User-defined operators and function overloading

REFERENCES

1. Bhushan Trivedi, “Programming with ANSI C++”, Oxford Press, Second Edition, 2012.
2. HM Deitel and PJ Deitel “C++ How to Program”, Seventh Edition, 2013, Prentice Hall
3. Ira Pohl, “Object–Oriented Programming Using C++”, Pearson Education, 2 Edition, 2013.
1. E Balagurusamy, “Object Oriented Programming with C++”, 3 edition, 2012, Tata McGraw Hill
5. Stanley B.Lippman, Josee Lajoie, “C++ Primer”, Pearson Education, Third Edition, 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
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CO3	2	2	2	2	2	-	-	-	-		2	1	1	3
CO4	2	1	2	2	-	-	-	2	-	-	-	-	3	2
CO5	1	2	1	2	-	-	-	2	-	-	-	2	2	2

CA16202 DATABASE MANAGEMENT SYSTEMS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of data models and conceptualize and depict a database system
- understand the fundamentals of ER diagram
- make a study of SQL and relational database design
- know about data storage techniques an query processing
- impart knowledge in transaction processing, concurrency

UNIT I INTRODUCTION 9

File systems versus Database systems–Data Models – DBMS Architecture – Data Independence – Data Modeling using Entity – Relationship Model – Enhanced E-R Modeling.

UNIT II RELATIONAL MODEL AND QUERY EVALUATION 9

Relational Model Concepts – Relational Algebra – SQL – Basic Queries – Complex SQL Queries – Views – Constraints – Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus – overview of commercial RDBMSs – Database Design – Functional Dependencies – Normal Forms – 1NF – 2NF-3NF-BCNF – 4NF-5NF - Algorithms for Executing Query Operations –– Cost Estimation

UNIT III TRANSACTION PROCESSING 9

Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL – Locking Techniques – Time Stamp ordering – Validation Techniques – Granularity of Data Items – Recovery concepts – Shadow paging–Log Based Recovery–Database Security Issues– Access control – Statistical Database Security

UNIT IV FILES AND INDEXING 9

File operations–Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Static Hashing - Indexes on Multiple Keys.

UNIT V SPECIAL PURPOSE DATABASES 9

OODBMS - Object-Based Databases - OO Data Model - OO Languages – Persistence – Object Relational Databases - Temporal Databases – Mobile Databases – Spatial Databases – Case Study for Design and Manage the Database for any Project

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the database and data models
- design a database using ER diagrams and map ER into Relations and normalize the relations
- acquire the knowledge of query evaluation to monitor the performance of the DBMS
- develop a simple database applications using normalization
- acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems

REFERENCES

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Sixth Edition, McGraw Hill, 2012.
2. C.J. Date, "An Introduction to Database Systems", Eight Editions, Pearson Education Delhi, 2013.
3. Ramez Elamassri and Shankant B-Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson Education Delhi, 2013.
4. Raghu Ramakrishnan, Johannes Gehrke, "Database management systems" McGraw Hill, 2013.
5. Peter Rob, Carlos Coronel, "Database System Concepts", Cengage Learning, 2012.

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	-	-	-	-	-	-	-	1	1	2
CO2	2	2	2	2	2	-	-	-	-	-	-	2	2	2
CO3	2	3	1	2	3	-	-	-	-		2	2	1	1
CO4	1	1	1	2	-	-	-	2	-	-	-	-	1	2
CO5	1	2	2	2	-	-	-	2	-	-	-	2	2	2

CA16203 SYSTEM SOFTWARE 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the relationship between system software and machine architecture
- understand the design and implementation of assemblers, linkers and loaders
- understand the design, function and implementation of assemblers, linkers and loaders
- have an understanding of macro processors
- have an understanding of system software tools

UNIT I BASICS OF SYSTEM SOFTWARE AND ASSEMBLER 9

Introduction – System software and SIC/XE machine architecture - Basic assembler functions – Assembler algorithms and data structures – Machine dependent assembler features, Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol-defining statements – Expressions – Program Blocks – Control Sections and Program Linking-Implementation examples MASM assembler.

UNIT II COMPILER- LEXICAL ANALYSIS, SYNTAX ANALYSIS 9

Phases of compiler-Lexical Analysis: Role of a Lexical analyzer, input buffering, specification and recognition of tokens, Finite Automata, Designing a lexical analyzer generator, Pattern matching based on NFA's. Syntax Analysis: Role of Parser, Top-down parsing, recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers.

UNIT III COMPILER CODE GENERATION, OPTIMIZATION 9

Intermediate languages: graphical representations, DAGs, Three address code, types of three address statements, syntax directed translation into three address code, implementation of three address statements-Code Optimization: Machine dependent and machine independent code generation: Sources of optimization-Code Generation-Semantic stacks, evaluation of expressions, control structures, and procedure calls.

UNIT IV LOADERS AND LINKERS 9

Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader Machine dependent loader features Relocation – Program Linking – Algorithm and Data Structures for Linking Loader. Machine-Independent loader features – Automatic Library Search – Loader Options Loader design options – Linkage Editors – Dynamic Linking – Bootstrap Loaders. Implementation examples: MSDOS linker.

UNIT V MACRO PROCESSORS & OTHER SYSTEM SOFTWARE 9

Basic macro processor functions – Macro Definition and Expansion – Macro Processor Algorithm and data structures – Implementation examples: MASM Macro Processor- Text editors – Overview of Editing Process - User Interface – Editor Structure – Interactive Debugging Systems – Debugging functions and capabilities – Relationships with Other parts of the system – User Interface Criteria -Virtual Machines

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- trace the path of a source code to object code and the to executable file
- design the front end of the compiler-scanner, parser
- understand and identify the relationship between system software and machine architecture
- analyze the functions of assembler, compiler, linker, and loaders
- know the design and implementation of loaders and linkers

REFERENCES

1. Leland Beck, "System Software – An Introduction to Systems Programming", Third Edition, Pearson Education, Inc., 2013
2. A.V. Aho, R. Shethi and Ulman; Compilers - Principles, Techniques and Tools, Second Edition, Pearson Education, 2012.
3. D. M. Dhamdhere, "Systems Programming and Operating Systems", Tata McGraw Hill Company, Second Edition, 2013.
4. John J. Donovan, "Systems Programming", Tata McGraw Hill Company, Second Edition, 2013.
5. V. Raghavan, "Principles of Compiler Design", Tata McGrawHill Education Publishers, 2012.

Mapping of Courses Outcomes with Programme Outcomes:
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	1	2	1	2	-	-	-	-	-	-	2	2	2
CO3	2	2	2	2	2	-	-	-	-		2	2	1	2
CO4	1	2	2	1	-	-	-	1	-	-	-	-	2	2
CO5	2	1	1	2	-	-	-	2	-	-	-	2	1	2

CA16204 **OPERATING SYSTEMS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- be aware of the evolution and fundamental principles of operating system and processes
- understand the various operating system components
- know about file management and the distributed file system concepts in operating systems
- be aware of components of operating system with relevant case study
- understand the process management, memory management

UNIT I INTRODUCTION **9**

Introduction-Types of operating systems-operating systems structures-Systems components operating systems services-System calls-Systems programs-Processes-process concept- process scheduling-operation on processes-co- operating processes-Inter process communications-CPU Scheduling-Scheduling criteria-Scheduling algorithms- Multiple-processor Scheduling

UNIT II PROCESS SYNCHRONIZATION **9**

Process Synchronization -Critical Section problem -Semaphores-Classical problems of synchronization-critical regions-Monitors-Deadlock Characterization-Deadlock handling-Deadlock Prevention-Deadlock avoidance-Deadlock Detection-Deadlock Recovery –Threads-Multithreading Models

UNIT III MEMORY MANAGEMENT **9**

Memory Management-Swapping-Contiguous Memory allocation-Paging-Segmentation-Virtual Memory-Demand paging-Page Replacement-Thrashing

UNIT IV DISK SCHEDULING AND DISTRIBUTED SYSTEMS **9**

Disk Structures-Disk Scheduling-File Systems Interface-File concepts-Access methods-Directory Structures-File System Implementation-File Systems structures-Directory Implementation-Allocation Methods-Free Space management-Distributed File systems-Naming and Transparency-Remote File Accesses- Stateful Versus Stateless Service-File replication

UNIT V CASE STUDIES **9**

Linux System-design Principles- process management-File Systems-Windows Vista-Systems Structures-Process management-memory management-Android OS-Virtual machine OS

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the operating system components and its services
- implement the algorithms in process management and solving the issues of IPC
- demonstrate the mapping between the physical memory and virtual memory
- understand file handling concepts in OS perspective
- understand the operating system components and services with the recent operating systems

REFERENCES

1. Abraham Silberschalz Peter B Galvin, G.Gagne, ”Operating Systems Concepts”, Seventh Edition, Addision Wesley Publishing Co.,2013
2. Andrew S.Tanenbaum, “Modern operating Systems”, Third Edition, PHI Learning Pvt.Ltd., 2012
3. William Stallings, “Operating Systems: Internals and Design Principles”,Seventh Edition, Prentice Hall, 2013.
4. H M Deital, P J Deital and D R Choffnes, “Operating Systems” ,3rd edition, Pearson Education, 2013.
5. D M Dhamdhere, “ Operating Systems: A Concept-based Approach”, Second Edition, Tata McGraw-Hill Education, 2013.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	3	2	1	3	-	-	-	-	-	-	2	2	2
CO3	2	2	2	2	3	-	-	-	-		2	2	1	2
CO4	2	2	2	2	-	-	-	3	-	-	-	-	2	2
CO5	1	2	1	3	-	-	-	2	-	-	-	2	2	3

CA16205 COMPUTER GRAPHICS AND MULTIMEDIA 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand computational development of graphics with mathematics
- provide in-depth knowledge of display systems, image synthesis, shape modelling of 3D application
- understand basic concepts related to Multimedia including data
- understand the concepts of standards, algorithms and software
- experience development of multimedia software by utilizing existing libraries and descriptions of algorithms

UNIT I BASIC CONCEPTS 9

2D Transformations - Clipping – Window - View Prot Mapping - Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques - Virtual Reality Environment.

UNIT II 3D GRAPHICS 9

3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method.

UNIT III MULTIMEDIA BASICS 9

Introduction to Multimedia – Components – Hypermedia – Authoring – Authoring tools – File formats – Color models – Digital Audio representation – Transmission – Audio signal processing – Digital music making – MIDI – Digital video – Video compression techniques – Video performance measurements – Multimedia Databases – Animation – Key frames and tweeting techniques – Principles of animation – Virtual reality – Multimedia for portable devices

UNIT IV MULTIMEDIA COMMUNICATION 9

Stream characteristics for Continuous media – Temporal Relationship – Object Stream Interactions – Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – Recovering from packet loss – RTSP — Multimedia Communication Standards –RTP/RTCP – SIP and H.263- Real time streaming and On-demand streaming

UNIT V MULTIMEDIA APPLICATION DEVELOPMENT 9

Design, Development and evaluation of multimedia a system - The development of user interface design - Design Process - Multimedia & the Internet - Multimedia conferencing - Multimedia file sharing – Multimedia broadcasting - Multimedia Development Issues - Multimedia project - Structured Multimedia development - Multimedia project timing - Sample project

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- gain proficiency in 3D computer graphics API programming
- enhance the perspective of modern computer system with modelling, analysis and interpretation of 2D and 3D visual information
- understand different realizations of multimedia tools
- develop interactive animations using multimedia tools
- gain the knowledge of different media streams in multimedia transmission

REFERENCES

1. Donald Hearn and M. Pauline Baker, "Computer Graphics in C Version", Second Edition, Pearson Education
2. Tom McReynolds – David Blythe " Advanced Graphics Programming Using OpenGL", Elsevier, 2013
3. Parag Havaldar and Gerard Medioni, "Multimedia Systems-Algorithms, Standards and Industry Practices", Course Technology, Cengage Learning, 2012.
4. John F. Koegel Bufend , "Multimedia systems", Pearson Education, Delhi, 2013
5. Ralf Steinmetz and Klara "Multimedia Computing, Communications and Applications", Pearson

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	1	2	-	-	-	-	-	-	-	2	1	2
CO2	1	1	2	2	1	-	-	-	-	-	-	1	2	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	2
CO4	2	1	1	1	-	-	-	2	-	-	-	-	2	2
CO5	2	2	2	2	-	-	-	2	-	-	-	2	2	2

CA16206 OBJECT ORIENTED PROGRAMMING LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- learn how C++ supports Object Oriented principles such as abstraction
- understand and apply the principles hiding

1. Write a C++ Program to illustrate Enumeration and Function Overloading
2. Write a C++ Program to illustrate Scope and Storage class
3. Implementation of ADT such as Stack and Queues
4. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
5. Write a Program to illustrate Static member and methods
6. Write a Program to illustrate Bit fields
7. Write a Program to overload as binary operator, friend and member function
8. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
9. Write a Program to illustrate Iterators and Containers
10. Write a C++ Program to illustrate function templates
11. Write a C++ Program to illustrate template class
12. Write C++ Programs and incorporating various forms of Inheritance
13. Write a C++ Program to illustrate Virtual functions
14. Exception Handling
15. File Handling – Read, Write, Update

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand and design the solution to a problem using object-oriented programming concepts
- use proper class protection mechanism to provide security

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	2	2	-	-	-	-	-	-	-	2	1	2
CO2	2	1	3	3	2	-	-	-	-	-	-	1	2	1

CA16207 **DBMS LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- understand the fundamentals of data models and conceptualize and depict a database system using ER diagram
- make a study of SQL and relational database design.

1. Creation of base tables and views.
2. Data Manipulation INSERT, DELETE and UPDATE in Tables. SELECT, Sub Queries and JOIN
3. Data Control Commands
4. High level language extensions – PL/SQL. Or Transact SQL – Packages . Use of Cursors, Procedures and Functions
5. Embedded SQL or Database Connectivity.
6. Oracle or SQL Server Triggers – Block Level – Form Level Triggers
7. Working with Forms, Menus and Report Writers for a application project in any domain 9. Front-end tools – Visual Basic/Developer 2000.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts of the database and data models
- design a database using ER diagrams and map ER into Relations and normalize the relations

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

CA16208 GRAPHICS AND MULTIMEDIA LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- understand computational development of graphics with mathematics
- provide in-depth knowledge of display systems, image synthesis, shape modeling of 3D application

Using C or C++

1. Implement the Bresenham's Line, Circle Drawing algorithms
2. Implement the Two Dimensional Transformations such as translation, rotation, scaling, reflection and shearing
3. Implement the Cohen-Sutherland 2D Line Clipping Algorithm.
4. Implement the Conversion between the color models.

Using Adobe Photoshop

5. Design the logo for a designing industry.
6. Design the fire effect for a text.

Using CorelDraw (or) PageMaker

7. Design the poster for the inter-collegiate cultural meet.

Using Adobe Flash

8. Animation using motion, shape and frame-by-frame animation (use onion skin, guide layer, masking and etc.)
9. Design and animate the cartoons, animals and the like

Using Dreamweaver

10. Create a web page with all multimedia elements.

COURSE OUTCOMES

At the end of the course the students would be able to

- gain proficiency in 3D computer graphics API programming
- enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2

PMA15301 RESOURCE MANAGEMENT TECHNIQUES 3 2 0 4

COURSE OBJECTIVES

To enable the students to

- provide the concept and an understanding of basic concepts in Operations Research
- understand the Techniques for Analysis and Modeling in Computer Applications
- understand, develop and solve mathematical model of linear programming problems
- understand, develop and solve mathematical model of Transport and assignment problems
- understand network modeling for planning and scheduling the project activities

UNIT I LINEAR PROGRAMMING MODELS 15

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method

UNIT II TRANSPORTATION AND ASSIGNMENT MODELS 15

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm – Variants of the Assignment problem

UNIT III INTEGER PROGRAMMING MODELS 15

Formulation – Gomory's IPP method – Gomory's mixed integer method – Branch and Bound technique.

UNIT IV SCHEDULING BY PERT AND CPM 15

Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

UNIT V QUEUEING MODELS 15

Characteristics of Queuing Models – Poisson Queues - (M / M / 1) : (FIFO / ∞ /∞), (M / M / 1) : (FIFO/ N / ∞), (M / M / C) : (FIFO / ∞ / ∞), (M / M / C) : (FIFO / N / ∞) models.

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of the course the students would be able to

- understand and apply linear, integer programming to solve operational problem with constraints
- apply transportation and assignment models to find optimal solution in warehousing
- prepare project scheduling using PERT and CPM
- identify and analyze appropriate queuing model to reduce the waiting time in queue
- use optimization concepts in real world problems

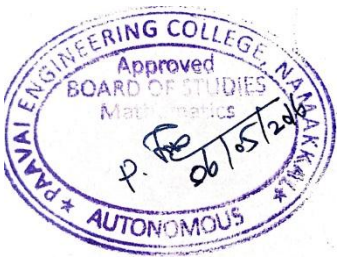
REFERENCES

1. Taha H.A., "Operations Research : An Introduction" 8th Edition, Pearson Education, 2011.
2. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2013.
3. Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand& Company Ltd, New Delhi, 3rd Edition, 2013.
4. John W. Chinneck "Feasibility and Infeasibility in Optimization Algorithms and ComputationalMethods' Springer, 2013
5. Ravindran, Phillips, Solberg,"Operations Research: Principles And Practice", 2ndEdition, JohnWiley& Sons, 01-Jul-2012

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3



CA15301 COMPUTER COMMUNICATION NETWORKS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand networking concepts and basic communication model
- understand network architectures and components required for data communication
- analyze the function and design strategy of physical, data link, network layer and transport layer
- acquire knowledge of various application protocol standard developed for internet
- analyze the trace for the flow of information from one node to another node in the network

UNIT I INTRODUCTION 9

Data Communications – Networks – Protocols and Standards. Network Models – OSI Model – Layers – TCP/IP Protocol Suite–Addressing. Digital Transmission – Digital-to-Digital Conversion – Analog-to-Digital Conversion – Transmission Modes. Analog Transmission – Digital-to-Analog Conversion – Analog-to-analog Conversion. Transmission Media – Guided and Unguided Media.

UNIT II DATA LINK LAYER 9

Error – detection and correction – Parity – LRC – CRC – Hamming code – Flow Control and Error control – stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - IEEE 802.4 - IEEE 802.5 IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III NETWORK LAYER 9

Internetworks–Circuit Switching- Packet Switching and Datagram approach – IP addressing methods– Subnetting – Routing – Distance Vector Routing – Link State Routing – BGP -Routers.

UNIT IV TRANSPORT LAYER 9

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V APPLICATIONS 9

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- identify the components required to build different types of networks
- understand the functionalities needed for data communication into layers
- choose the required functionality at each layer for given application
- understand the working principles of various application protocols
- acquire knowledge about security issues and services available

REFERENCES

1 Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2013.

2. William Stallings, "Data and Computer Communications", Ninth Edition, Prentice Hall, 2013.

3. Forouzan, " Data Communication and Networking", Fifth Edition , TMH 2013

4. Andrew S.Tannenbaum David J. Wetherall, "Computer Networks" Fifth Edition , Pearson Education 2013

5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-down Approach, Pearson Education, Limited, sixth edition,2013

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	3	2	3

CA15302 OBJECT ORIENTED ANALYSIS AND DESIGN 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the basic concept of OOPs concept
- provide a brief, hands-on overview of object-oriented analysis in software process
- discuss Case studies based project specifications to develop object-oriented models and identify implementation strategies
- demonstrate and apply basic object oriented techniques to create and modify object oriented analysis
- understand and apply testing techniques for object oriented software

UNIT I INTRODUCTION 9

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding– Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

UNIT II METHODOLOGY AND UML 9

Introduction– Survey – Rumbugh, Booch, Jacobson methods – Patterns – Creational - Abstract Factory – Factory Method – Behavioral – Momento – Mediator - Structural – Decorator - Facade – Concurrency Patterns – Lock – Reactor–Scheduler- Frameworks – Unified approach – Unified modeling language – Static and Dynamic models –UML diagrams– Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

UNIT IV OBJECT ORIENTED DESIGN 9

Design process and benchmarking – Axioms – Corollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer Interface - OOUI - MVC Architectural Pattern and Design – Designing the system.

UNIT V QUALITY AND TESTING 9

Quality assurance – Testing strategies – Test cases – Automated Testing Tools – Case Study - Cryptanalysis – Health Care Systems- Inventory Control System - Rational Rose Suite.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the basic concepts to identify state & behavior of real world objects
- able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- understand the concept of analysis, design & testing to develop a document for the project
- able to implement analysis, design & testing phases in developing a software project
- able to understand the testing strategies and know about automated testing tools

REFERENCES

1. Taha H.A., "Operations Research : An Introduction" 8th Edition, Pearson Education, 2011.
2. Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2013.
3. Brahma Dathan, SarnathRamnath, "Object-Oriented Analysis, Design and Implementation", Universities Press 2013.
4. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 2013
5. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2012

Mapping of Courses Outcomes with Programme Outcomes:
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		3	1	2	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	2	-	-	1	-	-	-	3	1	2

CA15303 SOFTWARE ENGINEERING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the software life cycle
- provide an insight into the processes of software development
- understand and practice the various fields such as analysis, design, development testing
- understand the software metrics
- apply metrics and testing techniques to evaluate the software

UNIT I INTRODUCTION 9

Software Engineering paradigms – Waterfall Life cycle model – Spiral Model – Prototype Model – fourth Generation Techniques–Planning – Software Project Scheduling – Risk analysis and management – Requirements and Specification – Case Study for Project Plan and SRS

UNIT II SOFTWARE DESIGN 9

Abstraction–Modularity–Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Documentation – Dataflow Oriented design – Jackson System development – Designing for reuse – Programming standards – Case Study for Design of any Application Project.

UNIT III SOFTWARE TESTING AND MAINTENANCE 9

Software Testing Fundamentals – Software testing strategies – Black Box Testing – White Box Testing – System Testing – Object Orientation Testing – State based Testing - Testing Tools – Test Case Management – Software Maintenance Organization – Maintenance Report – Types of Maintenance – Case Study for Testing Techniques

UNIT IV SOFTWARE METRICS 9

Scope – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Cost Estimation - Reliability – Software Quality Assurance – Standards – Case Study for COCOMO model

UNIT V SCM & WEB ENGINEERING 9

Need for SCM–Version Control – SCM process – Software Configuration Items – Taxonomy – CASE Repository – Features – Web Engineering

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- get an insight into the processes of software development
- able to understand the problem domain for developing SRS and various models of software engineering
- able to Model software projects into high level design using DFD,UML diagrams
- able to Measure the product and process performance using various metrics
- able to Evaluate the system with various testing techniques and strategies

REFERENCES

1. Roger S. Pressman, “Software Engineering: A Practitioner Approach”, Seventh edition, McGrawHill, 2013.
2. Richard Fairley, “ Software Engineering Concepts”, Tata McGraw Hill Edition, 2012
3. Ali Behforroz, Frederick J.Hudson, “Software Engineering Fundamentals”, Oxford Indian Reprint, 2013
4. Sommerville, “Software Engineering”, Sixth Edition, Addison Wesley-Longman, 2013.
5. Kassem A. Saleh, “Software Engineering”, First Edition, J.Ross Publishing, 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	2	2	2	2	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		3	1	2	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	2	1	2	-	-	1	-	-	-	3	1	2

CA15304 **WEB PROGRAMMING** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the concepts and architecture of the World Wide Web
- understand and practice mark-up languages
- understand and practice embedded dynamic scripting on client side Internet Programming
- understand and practice of java concept
- understand and practice web development techniques on client-side

UNIT I BASIC NETWORK AND WEB CONCEPT **9**

Internet standards – TCP and UDP protocols – URLs – MIME – CGI – Introduction to SGML

UNIT II MARKUP LANGUAGE **9**

Introduction to HTML and HTML5-Formatting and Fonts-Commenting Code– Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.

UNIT III STYLE SHEET **9**

The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS.

UNIT IV JAVAPROGRAMMING **9**

Java features – Java Platform – Java Fundamentals – Expressions, Operators, and Control Structures – Classes, Packages and Interfaces – Exception Handling

UNIT V PACKAGES **9**

AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection– Multithreading – Language Packages.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- acquire knowledge about functionalities of world wide web
- explore mark-up languages features and create interactive web pages using them
- learn and design Client side validation using scripting languages
- acquire knowledge about Open source JavaScript libraries
- design front end web page and connect to the back end databases

REFERENCES

1. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, “Internet and World Wide Web – How to Program”, Fifth Edition, Pearson Education, 2013.
2. Achyut S Godbole and AtulKahate, “Web Technologies”, Second Edition, Tata McGraw Hill,2012
3. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013.
4. Deitel, Deitel and Nieto, “Internet and World Wide Web – How to program”, Pearson Education Publishers, 2013.
5. R. Krishnamoorthy & S. Prabhu, “Internet and Java Programming”, New Age International Publishers, 2013

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	3	3	3	3	-	-	-	-		2	2	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	3	2	-	-	-	1	-	-	-	2	2	2

CA15305 SOFTWARE DEVELOPMENT – CASE TOOLS LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- understand and practice the various fields such as analysis, design, development testing of engineering
- develop skills to construct software of high quality with high reliability

1. Practicing the different types of case tools such as Rational Rose / other Open Source to be used for all the phases of Software development life cycle.
2. Data modeling
3. Source code generators
4. Apply the following to typical application problems:
   a. Project Planning
   b. Software Requirement Analysis
   c. Software Design
   d. Data Modeling& Implementation
5. Software Estimation
6. Software Testing
7. A possible set of applications may be the following:
   a. Library System
   b. Student Marks Analyzing System
   c. Text Editor.
   d. Create a dictionary.
   e. Telephone directory.
   f. Inventory System.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- model software projects into high level design using DFD,UML diagrams
- measure the product and process performance using various metrics

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA15306 **WEB PROGRAMMING LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- understand and practice embedded dynamic scripting on client side Internet Programming
- understand and practice of java concept

1. Create a web page with the following using HTML5
   a. To embed an image map in a web page
   b. To fix the hot spots
   c. Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Writing Java programs by making use of class, interface, package, etc for the following
   a. Different types of inheritance study
   b. Uses of 'this' keyword
   c. Polymorphism
   d. Creation of user specific packages
   e. Creation of jar files and using them
   f. User specific exception handling

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- explore mark-up languages features and create interactive web pages using them
- acquire knowledge about Open source JavaScript libraries

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

PEN15201 COMMUNICATION AND SOFT SKILLS LABORATORY 0 0 2 1

COURSE OBJECTIVES

To enable the students to

- develop the ability to communicate effectively in spoken English
- draft flawless resume in English and participate successfully in group discussions
- enhance their soft skills and interpersonal skill
- equip the learners to make effective presentations on topics in engineering and technology

UNIT I FORMAL & INFORMAL CONVERSATION PRACTICE 6

Role Play1- with family members, neighbours, friends, relatives etc. Simple Expressions – agreeing / disagreeing, persuading, wishing, consoling, advising, arguing, expressing opinions etc - Professional dialogues with the superiors-Conversation with different professionals- Situations like - Government and Corporate Offices, Official Meetings, Educational Institutions, (At the railway junction, malls, post office, bank) etc.

UNIT II ORAL REVIEW, RADIO SHOW &NARRATIVE TECHNIQUES 6

Oral review of movies and discussion or sharing the view on various concepts of the movie, Presentation of various radio programs like news, announcements, advertisements, entertainment programs etc. as a team activity, Understanding the basic narrative techniques-Narrating short stories with message, Narrating real life experiences.

UNIT III RÉSUMÉ / LETTER WRITING 6

Preparation of résumé–structure – use of words and language style – Types of letter – structure of a letter – format for writing letters – use of language in letters

UNIT IV RESENTATION SKILLS&GROUP DISCUSSION 6

Elements of effective presentation – Structure of presentation - Presentation tools – Voice modulation – effective use to presentation tools - Audience analysis - Body language – Video samples- Importance of GD – GD in selection process - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work – Body Language - Mock GD -Video samples

UNIT V INTERVIEW SKILLS 6

Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews-Video samples.

TOTAL PERIODS 30

At the end of the course the students would be able to

- speak effectively and confidently in English
- attend job interviews with confidence
- write effective job applications with resume.
- participate in GD with involvement and confidence

REFERENCES

1. Kalpana. V & Co., "Communication Skills Laboratory Manual", Vijay Nicole Imprints Pvt. Limited, Chennai. 2013
2. Anderson, P.V. "Technical Communication", Thomson Edition, New Delhi, 2012.
3. Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi, 2012
4. Kumar Sanjay, PushpLata, "Communication Skills (With CD)", Oxford University Press, New Delhi. 2011
5. Dutt, Kiranmai P and GeethaRajeevan, "BasicCommunication Skills", Foundation Books, New Delhi. 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	-	-	-	-	-	2	-	-	3	3	-	-	-	-
CO2	-	-	-	3	3	-	2	2	3	-	-	-	-	-
CO3	-	-	2	1	3	-	3	3	3	3	2	3	-	-
CO4	-	-	-	2	-	-	-	3	3	3	3	-	-	-

CA15401 C# and .NET FRAMEWORK 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- learn the .NET framework concept and understand the syntax of basic C# Programs
- learn C# elements and OOPS concepts
- learn fundamentals of window application programming and how to create a window application
- develop web-based applications and learn advanced features of C#
- understand the foundation of CLR execution

UNIT I INTRODUCTION TO C# 8

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT II OBJECT ORIENTED ASPECTS OF C# 9

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

UNIT III APPLICATION DEVELOPMENT ON .NET 8

Building Windows Applications, Accessing Data with ADO.NET.

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 8

Programming Web Applications with Web Forms, Programming Web Services.

UNIT V THE CLR AND THE .NET FRAMEWORK 12

Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- use Visual Studio .NET to implementing the .NET application and to Know the basic C# elements
- know the C# OOPS Concepts
- know the basic ADO.NET structures and understand the ADO.NET database connectivity
- understand the ASP.NET Programming Model and able to create ASP pages for web applications
- understand the internal functions of CLR and develop Web based applications on .NET CLR

REFERENCES

1. E. Balagurusamy, “Programming in C#”, Tata McGraw-Hill, 2014. (Unit I, II)
2. J. Liberty, “Programming C#”, 2nd ed., O’Reilly, 2013. (Unit III, IV, V)
3. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill, 2014.
4. Robinson et al, “Professional C#”, 2nd ed., Wrox Press, 2013.
5. Andrew Troelsen, “C# and the .NET Platform”, A1 Press, 2014.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	-	-	-	-	-	-	-	2	2	3	3	1	3	1
CO2	-	-	-	2	3	-	1	2	-	3	3	1	2	2
CO3	-	-	-	-	-	-	-	-	-	3	1	1	2	-
CO4	-	-	-	-	3	1	1	-	2	3	3	1	3	2
CO5	-	-	-	-	-	2	-	2	1	3	1	1	3	2

CA15402 FREE OPEN SOURCE SOFTWARE 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- know of how to do project for the open source software process
- learn the open source database during the analysis of the project
- understand the open source languages
- learn the basics of python concept
- understand the basics of Perl

UNIT I INTRODUCTION 9

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX Introduction–General Overview – Kernel Mode and user mode –Process–Advanced Concepts– Scheduling – Personalities – Cloning – Signals – Development with Linux.

UNIT II OPEN SOURCE DATABASE 9

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

UNIT III OPEN SOURCE PROGRAMMING LANGUAGES 9

PHP: Introduction–Programming in web environment– variables – constants – datatypes – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database–PHP and LDAP– PHP Connectivity – Sending and receiving E-mails – Debugging and Error handling – Security – Templates.

UNITIV PYTHON 9

Syntax and Style–Python Objects–Numbers–Sequences– Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

UNIT V PERL 9

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- prepare and do project for the open source software process
- understand the cost estimation techniques during the analysis of the project
- learn the quality concepts for ensuring the functionality of the software
- learn the Database concept
- practice and demonstrate various open source software

REFERENCES

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2013
2. Steve Suchring, “MySQL Bible”, John Wiley, 2012
3. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2012
4. Wesley J. Chun, “Core Phython Programming”, Prentice Hall, 2012
5. Martin C. Brown, “Perl: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	3	2	3	-	-	-	-	-	-	2	1	2
CO3	1	2	2	3	3	-	1	-	-		2	2	1	2
CO4	2	1	2	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	2	1	-	-	-	2	-	-	-	3	2	2

CA15403 DATA MINING AND DATA WAREHOUSING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- expose the students to the concepts of Data warehousing Architecture and Implementation
- understand Data mining principles and techniques and Introduce DM as a cutting edge business
- understand the concept of classification for the retrieval purposes
- know the clustering techniques in details for better organization and retrieval of data
- identify Business applications and Trends of Data mining

UNIT I DATA WAREHOUSE 8

Data Warehousing-Operational Database Systems vs. Data Warehouses-Multidimensional Data Model – Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.

UNIT II DATA MINING & DATA PREPROCESSING 9

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III ASSOCIATION RULE MINING 8

Introduction-Data Mining Functionalities-Association Rule Mining - Mining Frequent Item Sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV CLASSIFICATION & PREDICTION 10

Classification vs. Prediction–Data preparation for Classification and Prediction – Classification by Decision Tree Introduction–Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V CLUSTERING 10

Cluster Analysis:-Types of Data in Cluster Analysis–A Categorization of Major Clustering Methods– Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understanding the Store voluminous data for online processing
- prepare the Pre-process the data for mining applications
- learn the association rules for mining the data
- practice and deploy appropriate classification techniques
- understand the high dimensional data for better organization of the data

REFERENCES

1. Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2012.
2. K.P. Soman, ShyamDiwakar and V. Ajay, “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2012.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2013.
4. BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Pearson Education, 2012

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	3	1	-	-	-	1	-	-	-	3	2	3
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	3	2	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	1	-	-	-	-	2	2
CO5	2	2	3	3	-	-	-	1	-	-	-	3	2	3

CA15404 BIG DATA ANALYTICS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the Bigdata concept
- understand mining data stream system
- understand the Hadoop concept
- understand usage of file systems
- understand how to buid up framework

UNIT I INTRODUCTION TO BIG DATA 8

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data- Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools – Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II MINING DATA STREAMS 9

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions

UNIT III HADOOP 10

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

UNIT IV HADOOP ENVIRONMENT 9

Setting up a Hadoop Cluster-Cluster specification-Cluster Setup and Installation- Hadoop Configuration- Security in Hadoop- Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

UNIT V FRAMEWORKS 9

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphereBigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- write API based programs
- design and implement data stream systems
- analyze mining data streams
- design Hadoop concept
- understanding the Framwwork applications

REFERENCES

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2012.
2. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012
4. AnandRajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.

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COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	3
CO4	2	1	2	2	-	-	-	2	-	-	-	-	3	2
CO5	1	2	1	2	-	-	-	2	-	-	-	2	2	2

CA15405 FREE OPEN SOURCE SOFTWARE LABORATORY 3 2 0 4

COURSE OBJECTIVES

To enable the students to

- know of how to do project for the open source software process
- learn the cost estimation techniques during the analysis of the project

1. Basic Linux Commands
2. Students Details using Shell Program
3. Develop PHP program using Arrays, control structures, looping structures and Form Handling Develop a web application for Airline Reservation System using PHP.
4. Running Python: some simple exercise – e.g. Connecting with MySql database
5. Text processing with Perl: simple programs, connecting with database e.g., MYSQL

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- prepare and do project for the open source software process
- understand the cost estimation techniques during the analysis of the project

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO2	2	2	3	2	3	-	-	-	-		2	1	1	3

CA 15406 C# and .NET FRAMWORK LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- learn the cost estimation techniques during the analysis of the project
- understand the quality concepts for ensuring the functionality of the software

1. Programs using Branching, Looping.
2. Programs using Methods, Arrays, Strings.
3. Programs using Structures, Enumerations.
4. Programs using Inheritance.
5. Programs using Polymorphism.
6. Programs using Interfaces.
7. Programs using Operator overloading.
8. Programs using Delegates, Events, Errors and Exceptions.
9. Program to Build an Calculator widget
10. Programs Using Multi Module Assembly
11. Programs using application development on .net.
12. Programs using Web applications.

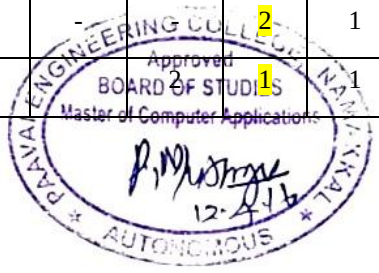
TOTAL PERIOD 60

COURSE OUTCOMES

At the end of the course the students would be able to

- learn the risk management activities and the resource allocation for the projects
- can apply the software estimation and recent quality standards for evaluation of the software projects

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO2	2	2	3	2	3	-	-	-	-	-	2	1	1	3



CA15407 TECHNICAL SEMIANR AND REPORT WRITING 0 0 4 2

The goal of this course is to train the students to critically evaluate a well-defined set of research subjects and to summarize the findings concisely in a paper of scientific quality. The paper will be evaluated based on the ability to understand a topic, communicate it and identify the issues. Results from this term paper will be presented to Fellow students and a committee of faculty members.

1. Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct primary sources.
2. Every student must write a short review of the topic and present it to fellow students and faculty (discuss the topic – expose the flaws – analyze the issues) every week.
3. The faculty should evaluate the short review and award marks with respect to the following.
   a. Has the student analyzed – not merely quoted – the most significant portions of the primary sources
   b. Employed?
   c. Has the student offered original and convincing insights?
   d. Plagiarism to be checked.
4. Every student should re-submit and present the review article including issues/ comments/ conclusions which had arisen during the previous discussion.
5. Every student should submit a final paper as per project specifications along with all short review reports (at least 4 internal reviews) and corresponding evaluation comments.
6. Every student should appear for a final external review exam to defend themselves.

TOTAL PERIODS 60

Mapping of Courses Outcomes with Programme Outcomes:
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

PCA15408 CAREER DEVELOPMENT LABORATORY 0 0 2 1

UNIT I CORPORATE READINESS 6

Business Communication–Inter & Intra Personal Skills–Business Etiquettes – Corporate Ethics – Communication Media Etiquette

UNIT II INTERVIEW SKILLS 6

Resume Building – Group Discussions – Presentation Skills – Entrepreneur Skills – Psychometric Assessment – Mock Interview

UNIT III QUANTITATIVE APTITUDE (QA) 2 6

Profit & Loss–Clock–Power & Square Roots – Train – Boats & Streams – Probability – Calendars – Permutations & Combinations - Partnership – Simplification – Pipes & Cisterns – Puzzles

UNIT IV LOGICAL REASONING (LR) 2 6

Statements & Assumptions – Matching Definitions – Logical Games – Making Judgments – Statements & Conclusions – Verbal Classifications

UNIT V VERBAL REASONING (VR) 2 6

Syllogisms – Data Sufficiency – Dice – Series Completion – Character Puzzles – Cube & Cuboid – Arithmetic Reasoning

TOTAL PERIODS 30

Mapping of Courses Outcomes with Programme Outcomes:
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

MC7501 WEB APPLICATION DEVELOPMENT 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- acquire knowledge on the usage of recent platforms in developing web applications
- understand architecture of J2EE and design applications using J2EE, Strut and hypernet
- understand framework of .NET and design applications using .NET, C#, Silverlite
- design and develop interactive, client-side, server-side executable web applications LAMP Stack
- explore the features of various platforms and frameworks used in web applications development

UNIT I J2EE Platform 9

Introduction -Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies – Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers - Java and LDAP - LDAP operations - Searching an LDAP server - Storing and retrieving java objects in LDAP – Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

UNIT II STRUTS AND HIBERNATE 9

Struts Architecture- Struts classes - Action Forward, Action Form, Action Servlet, Action classes – Understanding struts - config.xml, Understanding Action Mappings, Struts flow with an example application, Struts Tiles Framework, Struts Validation Framework – Hibernate - Architecture of Hibernate – Downloading Hibernate - Exploring HQL - Understanding Hibernate O/R Mapping.

UNIT III LAMP STACK 9

Overview of Lamp Stack - Features of Lamp Stack –Understanding Python Understanding LAMP and Its Effect on Web Development

UNIT IV .NET, C# 9

Introduction - .Net revolution - .Net framework and its architecture – CLR – What is Assembly – Components of Assembly – DLL hell and Assembly Versioning. Overview to C# - C # Compilation and Execution Process – C# Fundamentals (Data types, Operators, Programming constructs) – Inheritance –Sealed Classes – Interface - Overloading – Overriding – Method Hiding – C# Property – Exception Handling

UNIT V ASP.NET AND SILVERLIGHT 9

ASP.Net-IIS-ASP.Net Page Life Cycle– ASP Vs ASP.Net - HTML Controls Vs Server side Controls – Validation – Data binding in ASP.Net – Caching – Configuration in ASP.Net (web. config) – Session Controls management – View State in ASP.Net – ASP.Net. Introduction - RIA – Silverlight – XAML – App.Xaml – XAP – How Silverlight application executes in a web browser

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- knows how to design and implement Internet systems for enhancing education and design
- understand functionality of Internet system
- design a system according to customer needs using the available Internet technologies
- design and develop interactive, client-side, server-side executable web applications
- explore the features of various platforms and frameworks used in web applications development

REFERENCES

1. James Holmes “Struts: The Complete Reference, " 2nd Edition 2012, McGraw Hill Professional
2. Patrick Peak And Nick Heudecker, Patrick Peak, Nick Heudecker Hibernate Quickly, " 2013, Dream tech.,
3. Subrahmanyam Allamaraju and Cedric Buest , Professional Java Server Programming (J2EE 1.3 Edition), Shroff Publishers & Distributors Pvt Ltd
4. Jesse Liberty , ‘Programming C#, “ , 4th Edition, O'Reilly Media
5. Mario Szpuszta, Matthew MacDonald , “Pro ASP.NET 4 in C# 2010: Includes Silverlight 2, “Apress, Third Edition

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**													
COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	-	-	-	-	-	-	-	1	1	2
CO2	2	3	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		3	1	1	3
CO4	2	2	3	3	-	-	-	1	1	-	-	-	2	2
CO5	3	2	2	2	-	-	-	2	-	-	-	1	2	2

MC7502 SERVICE ORIENTED ARCHITECTURE 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- learn fundamental concepts of Service Oriented Architecture
- gain knowledge about SOAP
- Know the functionalities of UDDI
- understand the concepts of XML
- know about the Cloud Computing architecture and services

UNIT I SOA BASICS 9

Roots of SOA — Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures — Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation – Service Layers.

UNIT II XML AND WEB SERVICES 9

XML structure – Elements – Creating Well-formed XML - Name Spaces – Schema Elements, Types, Attributes – XSL Transformations – Parser – Web Services Overview – Architecture.

UNIT III WSDL, SOAP and UDDI 9

WSDL - Overview Of SOAP — HTTP — XML-RPC — SOAP: Protocol — Message Structure — Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments – UDDI.

UNIT IV SOA in J2EE and .NET 9

SOA platform basics — SOA support in J2EE — Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) — Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) – JAX-RS SOA support in .NET – ASP.NET webservices.

UNIT V CLOUD COMPUTING 9

Vision of Cloud computing – Cloud Definition – Characteristics and Benefits – Virtualization – Cloud computing Architecture – Cloud Reference Model, Types of Clouds – Cloud Platforms in Industry.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- know about the basic principles of service oriented architecture , its components andtechniques
- understand the architecture of web services
- design and develop web services using protocol
- technology underlying the service design
- Acquire the fundamental knowledge of cloud computing

REFERENCES

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006.
2. Heather Williamson, "XML, The Complete Reference", McGraw Hill Education, 2012.
3. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education,2002.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect'sGuide", Pearson Education, 2005.
5. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	3	2	3

MC7503 MOBILE COMPUTING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- learn the basic concepts, aware of the GSM, SMS, GPRS Architecture
- have an exposure about wireless protocols
- Know the Network, Transport Functionalities of Mobile communication
- understand the concepts of Adhoc and wireless sensor networks
- impart knowledge about Mobile Application Development

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS, ARCHITECTURE 9

Frequencies Spectrum- Multiplexing- Spread spectrum-GSM vs CDMA - 2G Mobile Wireless Services - Comparison of 2G and 3 G - GSM Architecture-Entities-Call Routing-PLMN-Address and identifiers- Network Aspects-Mobility Management-Frequency Allocation-Authentication and Security-SMS Architecture-Value Added Service through SMS-GPRS-GPRS and Packet Data Network-Architecture Network Operations- Data Service-Application.

UNIT II MOBILE WIRELESS SHORT RANGE NETWORKS 9

Introduction-WLAN Equipment-WLAN Topologies-WLAN Technologies-IEEE 802.11 Architecture WLAN MAC -Security of WLAN, Power Management-Standards- WAP Architecture-WAP 2.0- Bluetooth enabled Devices Network-Layers in Bluetooth Protocol-Security in Bluetooth- IrDA-ZigBee

UNIT III MOBILE IP NETWORK LAYER, TRANSPORT LAYER 9

IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location Management-Registration- Tunneling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol–VoIP -IPsec -Mobile Transport Layer-Conventional TCP/IP Transport Layer Protocol-Indirect, Snooping, Mobile TCP

UNIT IV MOBILE AD-HOC, SENSOR NETWORKS 9

Introduction to Mobile Ad hoc Network- MANET-Routing and Routing Algorithm-Security – Wireless Sensor Networks-Applications- Distributed Network and Characteristics-Communication Coverage-Sensing Coverage -Localization- Routing -Function Computation- Scheduling

UNIT V MOBILE APPLICATION DEVELOPMENT 9

Mobile Applications Development -Application Development Overflow-Techniques for Composing Applications - Understanding the Android Software Stack – Android Application Architecture – Developing for Android – The Android Application Life Cycle-The Activity Life Cycle-Creating Your First Android Activity-Creating Applications and Activities–Creating User Interfaces – Intents – Broadcast Receivers – Adapters – Data Storage, Retrieval, and Sharing.-Geo services- creating mobile applications like game, Clock, calendar, Convertor, phone book, Text Editor

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks
- understand the architectures, the challenges and the Solutions of Wireless Communication those are in use
- realize the role of Wireless Protocols in shaping the future Internet
- know about different types of Wireless Communication Networks and their functionalities
- develop simple Mobile Application Using Android

REFERENCES

1. Asoke K Talukder, Hasan Ahmed,Roopa R Yavagal "Mobile Computing", Tata McGraw Hill Pub ,Aug – 2012
2. Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012
3. Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking Complete" Morgan Kaufmann Series in Networking , 2012 (introduction, WLAN MAC)
4. Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2012
5. JochenSchillar "Mobile Communications" Pearson Education second Edition

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	3	2	3

MC7011 ADVANCED INTERNET PROGRAMMING LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- acquire knowledge on the usage of recent platforms in developing web applications
- understand architecture of JDBC and design applications using Java, Straut and Hypernet

1. Develop a car showroom inventory web application with 2-tier architecture. Use JSP and JDBC
2. Develop a real estate web application with n-tier architecture. Use JSP, Servlets and JDBC. The application should be able to add and search all properties such as rental/own, individual/apartment and duplex/semi-duplex
3. Develop any web application which authenticates using LDAP
4. Develop a standalone java application or a web application to add, modify and delete the LDAP attributes of the given input
5. Design a student identity management web application using struts framework. The application should be able to provide an identity such as student id, access to department assets with department id, access to lab assets with lab id.
6. Create an online bookstore that includes all validation controls available in ASP.NET
7. Create a component that receives two numbers from the user through a Web Form, and based on the user's in selection add or subtract the two numbers and returns the result to the Web Form. The result should be displayed the Web Form using ASP.NET
8. Create a Silverlight Application for the SharePoint Client Object Model
9. Create a graph using the SharePoint Object Model and Silverlight Graphing controls

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- knows how to design and implement Internet systems for enhancing education and design
- explore the features of various platforms and frameworks used in web applications development

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

MC7511 XML AND WEB SERVICES LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- provide fundamental concepts of Service Oriented Architecture
- gain knowledge about SOAP, UDDI and XML to create web services

1. XML document creation.
2. Importing and Exporting XML document in database.
3. XSL Transformation
4. Internal and External DTD creation
5. XML Schema creation
6. Parsing XML document using DOM/SAX parser.
7. Web Service creation using JAX-WS
8. Web Service creation using JAX-RS
9. Web Service creation using .NET
10. JAXB Marshaling and Unmarshaling

A possible set of applications may be the following:

a. Currency Conversion
b. Temperature Conversion
c. Ticket Booking
d. Dictionary

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- known about the basic principles of service oriented architecture, its components and techniques
- understand the architecture of web services

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
Cos	**Programme Outcomes (Pos)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	1	2	3	-	-	-	2	-	-	-	-	3	2
CO2	2	2	2	2	-	-	-	1	-	-	-	2	2	3

MC7512 MINI PROJECT (SOCIALLY RELEVANT) 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- team Project with a maximum of two in a team
- students shall select a domain and develop an application with social relevance

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the students shall select a domain and develop an application with social relevance
- documentation is to be based on the standards

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	1	2	3	-	-	-	2	-	-	-	-	3	2
CO2	2	2	2	2	-	-	-	1	-	-	-	2	2	3

CAE15401 ENERGY AWARE COMPUTING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- examine the design of power efficient architecture, power and performance tradeoffs,
- restructuring of software and applications and standards for energy aware Hardware and software
- know the fundamental principles energy efficient devices
- study the concepts of Energy efficient storage
- know energy efficient techniques involved to support real-time systems

UNIT I INTRODUCTION 9

Energy efficient network on chip architecture for multi core system-Energy efficient MIPS CPU core with fine grained run time power gating – Low power design of Emerging memory technologies.

UNIT II ENERGY EFFICIENT STORAGE 9

Disk Energy Management-Power efficient strategies for storage system-Dynamic thermal management for high performance storage systems-Energy saving technique for Disk storage systems.

UNIT III ENERGY EFFICIENT ALGORITHMS 9

Scheduling of Parallel Tasks – Task level Dynamic voltage scaling – Speed Scaling – Processor optimization-Memetic Algorithms – Online job scheduling Algorithms.

UNIT IV REAL TIME SYSTEMS 9

Multi processor system – Real Time tasks- Energy Minimization – Energy aware scheduling- Dynamic Reconfiguration-Adaptive power management-Energy Harvesting Embedded system.

UNIT V ENERGY AWARE APPLICATIONS 9

On chip network – Video codec Design – Surveillance camera- Low power mobile storage

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- design Power efficient architecture Hardware and Software
- analyze power and performance tradeoff between various energy aware storage devices
- implement various energy aware algorithms
- restructure the software and Hardware for Energy aware applications
- design Power efficient architecture Hardware and Software

REFERENCES

1. Handbook of Energy Aware and Green computing, Ishfaq Ah mad, Sanjay Ranka, Chapman and Hall/ CRC, 2012
2. Energy Aware system design Algorithms and Architecture, Chong-Min Kyung, Sungiooyoo, Springer, 2011.
3. Energy Aware computing, Bob steigerwald ,Chris: Luero,Intel Press,2012.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	3	1	-	-	-	1	-	-	-	3	2	3
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	3	2	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	1	-	-	-	-	2	2
CO5	2	2	3	3	-	-	-	1	-	-	-	3	2	3

CAE15402 INFORMATION SECURITY 3 0 0 3

COURSE OBJECTIVES

To enable students to

- understand the basics of cryptography
- learn to find the vulnerabilities in programs and to overcome them,
- know the different kinds of security threats in networks and its solution
- know the different kinds of security threats in databases and solutions available
- learn about the models and standards for security

UNIT I ELEMENTARY CRYPTOGRAPHY 9

Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates .

UNIT II PROGRAM SECURITY 9

Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls Against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Flaws – Common Weakness Enumeration Most Dangerous Software Errors

UNIT III SECURITY IN NETWORKS 9

Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec – Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection Systems – Secure e-mail.

UNIT IV SECURITY IN DATABASES 9

Security requirements of database systems – Reliability and Integrity in databases –Redundancy – Recovery – Concurrency/ Consistency – Monitors – Sensitive Data – Types of disclosures – Inference-finding and confirming SQL injection

UNIT V SECURITY MODELS AND STANDARDS 9

Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base – Bell-LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison - Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCI DSS – Security Standards - ISO 27000 family of standards – NIST.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- apply cryptographic algorithms for encrypting and decryption for secure data transmission
- understand the importance of Digital signature for secure e-documents exchange
- understand the program threats and apply good programming practice
- get the knowledge about the security services available for internet and web applications
- understand data vulnerability and sql injection

REFERENCES

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Fourth Edition, Pearson Education, 2007.
2. Michael Whitman, Herbert J. Mattord, “Management of Information Security”, Third Edition, Course Technology, 2010.
3. William Stallings, “Cryptography and Network Security : Principles and Practices”, Fifth Edition, Prentice Hall, 2010.
4. Michael Howard, David LeBlanc, John Viega, “24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them”, First Edition, McGrawHill Osborne Media, 2009.

Matt Bishop, “Computer Security: Art and Science”, First Edition, Addison-wesley

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		2	1	1	3
CO4	2	1	2	2	-	-	-	2	-	-	-	-	3	2
CO5	1	2	1	2	-	-	-	2	-	-	-	2	2	2

CAE15403 DISTRIBUTED COMPUTING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the phases of distributed computing
- be aware of the synchronization
- build concepts communication protocols
- learn about shared memory
- learn the design issues and distributed system concepts

UNIT I INTRODUCTION 9

Characterization of distributed systems - Examples - Resource sharing and the web - Challenges – System models -Architectural and fundamental models-Networking and internetworking–Types of networks-Network principles - Internet protocols.

UNIT II MESSAGE PASSING AND SYNCHRONIZATION 9

Interprocess communication - The API for the internet protocols - External data representation and marshalling - Client-Server communication - Group communication - Desirable features message passing system- Issues in message passing- Synchronization- Clock synchronization- Event ordering - Mutual exclusion- Deadlock- Election Algorithm - Buffering.

UNIT III REMOTE PROCEDURE CALL 9

RPC model - Transparency of RPC- Implementing RPC mechanism- Stub generation- Marshaling arguments and results- Server management- Parameter passing semantics - Call semantics- Communication protocols for RPCs - Complicated RPC client server binding- Exception handling- Security- Special types of RPCs- RPCs in heterogeneous environments- Lightweight RPC.

UNIT IV DISTRIBUTED SHARED MEMORY 9

General architecture of DSM systems- Design and implementation of DSM- Granularity- Structure of shared memory space- Consistency models- Replacement strategy- Thrashing- Other approaches to DSM- Heterogeneous DSM and advantages of DSM.

UNIT V DISTRIBUTED NAMING 9

Introduction- Desirable features of naming system- Fundamental concepts- System oriented names- Object locating mechanisms-Human oriented names- Name caches - Naming and security.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- apply basic principles and practices of Computer Science and Engineering to productively
- engage in the research
- design and conduct experiments, as well as to analysed
- design the interpret data on experiments relevant to Computer Science practice
- identify, analyze, formulate and solve engineering problems

REFERENCES

1. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems Concepts and Design, Pearson Education, 2009.
2. Pradeep K Sinha . Distributed Operating Systems: Concepts and design,. IEEE computer press, 2007.
3. Andrew S Tanenbaum, Maartenvan Steen, Distibuted Systems –Principles and Pardigms, Pearson Education, 2002.
4. Mullender, Distributed Systems, Addison Wesley, 1993.
5. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education, 2004.

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	-	-	-	-	-	-	-	1	1	2
CO2	2	3	2	2	3	-	-	-	-	-	-	2	2	2
CO3	2	2	3	2	3	-	-	-	-		1	2	2	2
CO4	1	2	2	1	-	-	-	2	-	-	-	-	3	2
CO5	1	3	2	2	-	-	-	2	-	-	-	2	2	2

CAE15404 ENTERPRISE APPLICATION INTEGRATION 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- describe approaches to enterprise application integration
- understand the integration middleware
- evaluate the integration approaches suitable for a given problem
- understand the integration
- evaluate the integration approaches against specified requirements

UNIT I INTRODUCTION 9

Requirements for EAI - Challenges in EAI – Integration with legacy systems – Integration with partners - Heterogeneous environment–Implementation approaches – Web services, messaging, ETL, direct data integration – Middleware requirements – Approaches to integration – services oriented and messaging.

UNIT II INTEGRATION PATTERNS 9

Introduction to integration patterns – Architecture for application integration – Integration patterns – Point to point, broker, message bus, publish/subscribe, Challenges in performance, security, reliability - Case studies

UNIT III SERVICE ORIENTED INTEGRATION 9

Business process integration - Composite applications-services – Web services – Service choreography and orchestration-Business process modeling-BPMN, Business process execution–BPEL–Middleware infrastructure - Case studies

UNIT IV MESSAGING BASED INTEGRATION 9

Messaging – Synchronous and asynchronous – Message structure – Message oriented middleware – Reliability mechanisms – Challenges – Messaging infrastructure – Java Messaging Services – Case studies.

UNIT V ENTERPRISE SERVICE BUS 9

Enterprise Service Bus – routing, scalable connectivity, protocol and message transformations, data enrichment, distribution, correlation, monitoring – Deployment configurations – Global ESB, Directly connected, Federated, brokered ESBs–Application server based – Messaging system based – Hardware based ESBs – Support to SOA, message based and event based integrations – Case studies.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- describe different approaches to integration enterprise applications
- analyze specifications and identify appropriate integration approaches
- analyze service oriented integration
- develop a suitable integration design for a given problem
- identify appropriate integration middleware for a given problem

REFERENCES

1. George Mentzas and Andreas Frezen (Eds), "Semantic Enterprise Application Integration for Business Processes: Service-oriented Frameworks", Business Science Reference, 2009
2. WaseemRoshen, "SOA Based Enterprise Integration", Tata McGrawHill, 2009.
3. G Hohpe and B Woolf, "Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions",Addison-Wesley Professional, 2003
4. D Linthicum, "Next Generation Application Integration: From Simple Information to WebServices", Addison-Wesley, 2003
5. Martin Fowler, "Patterns of Enterprise Application Architecture", Addison- Wesley, 2003

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	-	-	-	-	1	2	2
CO2	2	1	1	2	2	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	2	2
CO4	1	2	2	1	-	-	-	2	-	-	-	-	2	2
CO5	2	3	2	1	-	-	-	1	-	-	-	3	2	3

CAE15405 GAME PROGRAMMING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand of game design and development
- understand the processes, mechanics, issues in game design, game engine development
- understand modelling, techniques, handling situations, and logic
- understand the game platforms and frameworks
- design and develop interactive games

UNIT I 3D GRAPHICS FOR GAME PROGRAMMING 9

Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Animation, Physics -based Simulation

UNIT II GAME DESIGN PRINCIPLES 9

Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding

UNIT III GAMING ENGINE DESIGN 9

Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics

UNIT IV GAMING PLATFORMS AND FRAMEWORKS 9

Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity

UNIT V GAME DEVELOPMENT 9

Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand and apply 3 D concepts in Game programming
- gain knowledge about principles and levels of design in various game development
- gain knowledge about gaming engine design for controlling
- analyze various gaming platforms
- explore into various platforms and frameworks available for game development

REFERENCES

1. David H. Eberly, “3D Game Engine Design, Second Edition: A Practical Approach to Real- Time Computer Graphics” Morgan Kaufmann, 2 Edition, 2006.
2. JungHyun Han, “3D Graphics for Game Programming”, Chapman and Hall/CRC,1st edition,2011
3. Mike McShaffrfy, “Game Coding Complete”, Third Edition, Charles River Media, 2009.
4. Jonathan S. Harbour, “Beginning Game Programming”, Course Technology PTR, 3 edition,2009
5. Ernest Adams and Andrew Rollings, “Fundamentals of Game Design”, Prentice Hall 1st edition,2006

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CAE15406 SOFT COMPUTING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- learn the key aspects of Soft computing
- know about the components and building block hypothesis of Genetic algorithm
- understand the features of neural network and its applications
- study the fuzzy logic components
- gain insight onto Neuro Fuzzy modeling and control

UNIT I INTRODUCTION TO SOFT COMPUTING 9

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS 9

Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem),Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT III NEURAL NETWORKS 9

Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in neural networks.

UNIT IV FUZZY LOGIC 9

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

UNIT V NEURO-FUZZY MODELING 9

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case Studies.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- implement machine learning through neural networks
- gain Knowledge to develop Genetic Algorithm and Support vector machine based machine learning system
- write Genetic Algorithm to solve the optimization problem
- understand fuzzy concepts and develop a Fuzzy expert system to derive decisions
- model Neuro Fuzzy system for data clustering and classification

REFERENCES

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003
2. KwangH.Lee, "First course on Fuzzy Theory and Applications", Springer–Verlag Berlin Heidelberg, 2005.
3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
4. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley

Mapping of Courses Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week

COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	2	2	3	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	1	2	3	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	1	2	-	-	-	2	-	-	-	3	2	3

MC7006 **M – COMMERCE** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the E – commerce strategies and value chains
- understand the M-commerce services
- understand M – commerce infrastructure and applications
- know the availability of latest technology and applications of M- commerce in various domains
- apply mobile commerce in business-to-business application

UNIT I ELECTRONIC COMMERCE 9

Introduction -The e-commerce environment - The e-commerce marketplace -Focus on portals, Location of trading in the marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies - the dot-com - E-commerce versus E-business.

UNIT II MOBILE COMMERCE 9

Introduction – Infrastructure of M–Commerce –Types of Mobile Commerce Services–Technologies of Wireless Business – Benefits and Limitations, Support, Mobile Marketing & Advertisement, non– Internet Applications in M–Commerce – Wireless/Wired Commerce Comparisons

UNIT III MOBILE COMMERCE: TECHNOLOGY 9

A Framework For The Study of Mobile Commerce – NTT Docomo's I– Mode – Wireless Devices For Mobile Commerce– Towards A Classification Framework For Mobile Location Based Services – Wireless Personal and Local Area Networks –The Impact of Technology Advances on Strategy Formulation in Mobile Communication Networks

UNIT IV MOBILE COMMERCE: THEORY AND APPLICATIONS 9

The Ecology of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption of Mobile Gaming Services – Mobile Data Technologies and Small Business Adoption and Diffusion – M–Commerce in The Automotive Industry – Location– Based Services: Criteria for Adoption and Solution Deployment – The Role of Mobile Advertising in Building a Brand – M–Commerce Business Models

UNIT V BUSINESS– TO– BUSINESS MOBILE E-COMMERCE 9

Enterprise Enablement – Email And Messaging – Field Force Automation (Insurance,Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking and Maintenance/Management – Remote IT Support –Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- apply E – commerce principles in market place
- apply M – commerce principles to various business domains
- understand the theory and applications of M-commerce in business domain
- get an exposure to current technological advancements in M-commerce
- build M – commerce business models

REFERENCES

1. Dave Chaffey, "E-Business and E-Commerce Management", Third Edition, 2009, Pearson Education
2. Brian E. Mennecke, Troy J. Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.
3. P. J. Louis, "M-Commerce Crash Course", McGraw- Hill Companies February 2001.
4. Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business" Cambridge University Press March 2001
5. Michael P. Papazoglou, Peter M.A. Ribbers, 'e-business organizational and Technical foundation ', Wiley India 2009

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

MC7007 **HEALTH CARE MANAGEMENT** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the basic concepts of health care system
- know about creating and maintaining health care information systems
- understand information architecture
- ensure access of clinical information system on the fly
- understand IT governance and assessment of health care information system

UNIT I INTRODUCTION **9**

Introduction to health care information – Health care data quality – Health care information regulations, laws and standards.

UNIT II HEALTH CARE INFORMAION SYSTEMS **9**

History and evolution of health care information systems – Current and emerging use of clinical information systems – system acquisition – System implementation and support.

UNIT III INFORMATION TECHNOLOGY **9**

Information architecture and technologies that support health care information systems – Health care information system standards – Security of health care information systems.

UNIT IV MANAGEMENT OF IT CHALLENGES **9**

Organizing information technology services – IT alignment and strategic planning – IT governance and management.

UNIT V T INITIATIVES **9**

Management's role in major IT initiatives – Assessing and achieving value in health care information systems. Case study

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- develop an understanding of basic research skills applicable to the design
- apply evaluation and implementation of appropriate Healthcare Information Systems (HIS)
- analyze the impact, strengths and weaknesses of various HIS in any healthcare settings
- write reports on the roles of HIS and their impact on facilitating superior healthcare delivery Design a suitable HIS architecture
- use research methods and analysis together to plan the successful implementation of an appropriate HIS solution

REFERENCES

1. Karen A Wager, Frances Wickham Lee, John P Glaser, "Managing Health Care Information Systems: A Practical Approach for Health Care Executives", John Wiley, 2nd edition 2009.
2. Marion J. Ball, Charlotte Weaver, Joan Kiel ,"Healthcare Information Management Systems: Cases, Strategies, and Solutions", Springer, 2010, 3rd edition
3. Rudi Van De Velde and Patrice Degoulet, "Clinical Information Systems : A Component based approach", Springer 2005.
4. Kevin Beaver,Healthcare Information Systems, Second edition Best Practices, CRC Press, 2002
5. Marion J. BallHealthcare Information Management Systems: A Practical Guide Springer-Verlag GmbH, 1995.

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COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

MC7008 GEOLOGICAL INFORMATION SYSTEMS 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the basic concepts of geological information systems
- provide an exposure to spatial database structures and their utility in GIS
- learn vector data processing
- understand the process of scanning, digitizing and georeferencing
- introduce the raster and vector geoprocessing capabilities of GIS

UNIT I SPATIAL DATA REPRESENTAION 9

GIS – Definition and related terminology- Components of GIS: Data, Technology, Application – digital representation of geospatial data – raster – vector – object oriented – geo database model-analysis

UNIT II DATA DIGITIZATION AND PREPARATION 9

Characteristics of raster data processing-raster File format-Acquiring and handling raster Data- Georeferencing - Preproceesing- mosaicking – Linking digital databases: ODBC – GPS data integration Characteristics of Vector Geoprocessing -Vector Data Input – Digitizer: Principles, Co-ordinate transformation – Graphical data editing – Scanner: Principles, On Screen Digitization-post scanning importing- data editing

UNIT III VECTOR DATA PROCESSING 9

Non-topological analysis: Attribute database query, SQL, Summary statistics-statistical computation calculation - quantification- Address Geocoding, -Topological analysis Feature based topological functions- overlay-buffering - Layer based topological function-Reclassification, Aggregation, Overlay analysis- Point-in- polygon, Line-in-polygon,Polygon-on-polygon: Clip, Erase, Identity, Union, Intersection – Network based Geoprocessing –Output functions

UNIT IV RASTER DATA ANALYSIS 9

Raster Geospatial Data Analysis-Local operations: Reclassification, Logical and Arithmetic overlay operations – Neighbourhood operations: Aggregation, Filtering, Slope and Aspect map – Extended neighbourhood operations: - Statistical Analysis, Proximity, Connectivity operations, Buffering, Viewshed analysis – Regional operations: Area, Perimeter, Shape, and Identification of region and Classification-output functions of Raster geoprocessing

UNIT V GIS MODELLING AND APPLICATIONS 9

Spatial modelling – External, Conceptual, Logical, Internal –GIS Modeling with case study- spatial data mining - DEM- introduction and applications

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand GIS concepts and spatial data representation
- design spatial data input in raster form as well as vector form
- analyze data analysis
- understand vector data analysis and output functions
- understand raster data geo processing

REFERENCES

1. Lo, C.P. and Yeung, Albert K.W., Concepts and Techniques of Geographic Information Systems, Prentice Hall, 2/E, 2009.
2. Peter A. Burrough, Rachael A. McDonnell, Principles of GIS, Oxford University Press, 2000
3. Kang-Tsung Chang ,Introduction to Geographic Information Systems, McGraw-Hill Higher Education, 2006
4. Robert Laurini and Derek Thompson, Fundamentals of Spatial Information Systems, Academic Press, 1996
5. Paul A. Longley, Mike Goodchild, David J. Maguire, Geographic Information Systems and Science, John Wiley & Sons Inc,2011.

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COs	**Programme Outcomes (POs)**													
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CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	2	2	3	3	-	-	-	-	-	-	2	1	2
CO3	1	2	2	2	2	-	-	-	-		2	1	1	3
CO4	1	2	3	1	-	-	-	1	-	-	-	-	2	2
CO5	2	2	2	2	-	-	-	2	-	-	-	2	2	3

MC7009 **HUMAN RESOURCE MANAGEMENT** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the importance of human resources
- describe the steps involved in the human resource planning process
- understand the stages of employee socialization and training needs
- know about the purposes of performance management systems and appraisal
- know the list of occupational safety and health administration enforcement priorities

UNIT I FUNDAMENTALS OF HRM **9**

Introduction- importance of HRM – functions- qualities of HR manager – evolution and growth of HRM – trends and opportunities - HRM in global environment – legal and ethical context – laws for discriminatory practices – equal opportunity employment.

UNIT II STAFFING, RECRUITMENT AND SELECTION **9**

HR Polices - need, type and scope - human resource planning - job analysis - recruiting goals – recruiting sources – global perspective – selection process – pre-employment testing – interviews – job offers – hiring mistakes - key element for successful predictors.

UNIT III TRAINING AND DEVELOPMENT **9**

Socialization – new employee orientation, training, development – organizational development – methods – evaluating training– international training and development issues – career development - value for organization and individual – mentoring and coaching – traditional career stages

UNIT IV PERFORMANCE EVALUATION, REWARDS AND BENEFITS **9**

Appraisal process – methods – factors distort appraisal – team appraisal – international appraisal – rewards – Theories of motivation - compensation administration – job evaluation and pay structure – special cases of compensation – executive compensation programs – employee benefits.

UNIT V SAFE AND HEALTHY WORK ENVIRONMENT **9**

Occupational safety and health act - issues – stress – assistance program – labor management - employee unions – labor legislation. Promotion, demotion, transfer and separation – employee grievances – redressal methods.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- identify the primary external influences affecting HRM
- outline the components and the goals of staffing, training and development
- understand the selection procedure in various organizations
- understand the practices used to retain the employees and able to evaluate their performance
- identify the stress and the cause of burn out

REFERENCES

1. Decenzo and Robbins, Human Resource Management, Wilsey, 10th edition, 2012.
2. Mamoria C.B. and Mamoria. S., Personnel Management, Himalaya Publishing Company, 1997.
3. Mirza S. Saiyadain Human Resource Management , Tata McGraw Hill , 4th edition 2009.
4. EugenceMckenna and Nic Beach Human Resource Management, Pearson Education Limited, 2002.
5. Dessler, Human Resource Management, Pearson Education Limited, 2002.

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COs	**Programme Outcomes (POs)**													
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CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

MC7010 ENTERPRISE RESOURCE PLANNING 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the concept of ERP
- comprehend the purpose of Enterprise Systems
- understand the major process of ERP
- cognize the activities in Integration
- identify the key phases in the recent trends of ERP development

UNIT I INTRODUCTION TO ERP 9

ERP essentials – ERP evolution – ERP market – ERP tiers – information systems – Presentation tier – Application tier – database tier.

UNIT II ENTERPRISE SYSTEMS 9

Enterprise systems – stand alone mainframe systems – client server architecture – service oriented architecture – types of enterprise systems – types of data – SAP overview.

UNIT III PROCESS IN ERP 9

Basic Procurement process – physical flow – document flow – information flow – financial impact - role of enterprise systems in the procurement process – fulfillment process – production process.

UNIT IV INTEGRATION 9

Integrated processes – Integrated processes execution – additional intra company processes – extended (intracompany) processes.

UNIT V CASE STUDY 9

ERP for construction industry – ERP for a corrugated box manufacturing company – ERP for lens making company–ERP for furniture manufacturing company – ERP for toys manufacturing company - Mc Donald's story – Automobile enterprises.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- conceive the basics concepts of ERP
- use Knowledge documentation for Enterprise Systems
- analyze Problem and Process in ERP
- manage Integration of ERP
- acquire knowledge about security issues and services available

REFERENCES

1. Simha R Magal, Jeff Word, “Essentials of Business Processes and Information Systems”, Wiley Publications, 2009.
2. Marianne Bradford, “Modern ERP: Select, Implement and use Today's advanced business systems”, Second Edition, Lulu Publishers, 2010.
3. Jyotindra Zaveri, “Enterprise Resource Planning”, Second edition, Himalaya Publishing House, 2012.

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COs	**Programme Outcomes (POs)**													
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CO2	2	2	2	2	2	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		3	1	2	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	2	1	2	-	-	1	-	-	-	3	1	2

MC7012 **AD-HOC AND SENSOR NETWORKS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the basics of Ad-hoc & Sensor Networks
- learn various fundamental and emerging protocols of all layers in ad-hoc network
- study about the issues pertaining to major obstacles in establishment and efficient management of ad-hoc and sensor networks
- understand the nature and applications of ad-hoc and sensor networks
- understand various security practices and protocols of Ad-hoc and Sensor Networks

UNIT I ADHOC NETWORKS FUNDAMENTALS AND MAC PROTOCOLS 9

Fundamentals Of WLans – IEEE 802.11 Architecture - Self Configuration And Auto Configuration Issues in Ad-Hoc Wireless Networks – MAC Protocols For Ad-Hoc Wireless Networks – Contention Based Protocols - TCP Over Ad-Hoc Networks-TCP Protocol Overview - TCP And MANETs – Solutions For TCP Over Ad-Hoc Networks.

UNIT II ADHOC NETWORK ROUTING AND MANAGEMENT 9

Routing in Ad-Hoc Networks- Introduction -Topology based versus Position based Approaches - Proactive, Reactive, Hybrid Routing Approach - Principles and issues – Location services – DREAM – Quorums based Location Service – Grid – Forwarding Strategies – Greedy Packet Forwarding – Restricted Directional Flooding - Hierarchical Routing- Other Routing Protocols.

UNIT III SENSOR NETWORK COMMUNICATION PROTOCOLS 9

Introduction–Architecture- Single Node Architecture – Sensor Network Design Considerations – Energy Efficient Design Principles for WSN's – Protocols for WSN – Physical Layer – Transceiver Design Considerations – MAC Layer Protocols – IEEE 802.15.4 Zigbee – Link Layer and Error Control Issues – Routing Protocols – Mobile Nodes and Mobile Robots - Data Centric & Contention Based Networking – Transport Protocols & QoS – Congestion Control Issues – Application Layer Support.

UNIT IV SENSOR NETWORK MANAGEMENT AND PROGRAMMING 9

Sensor Management - Topology Control Protocols and Sensing Mode Selection Protocols - Time Synchronization - Localization and Positioning – Operating Systems and Sensor Network Programming – Sensor Network Simulators.

UNIT V SOFTWARE TESTING AND QUALITY METRICS 9

Security in Ad-Hoc and Sensor Networks – Key Distribution and Management – Software based Antitamper Techniques – Water Marking techniques – Defense against Routing Attacks – Secure Adhoc Routing Protocols – Broadcast Authentication WSN Protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- work with existing Ad-hoc and sensor network protocols and standards
- create a Sensor network environment for different type of applications
- design ad-hoc and sensor network architectures using QOS and Congestion control mechanisms
- interpret the various control fields of the protocol in each layer
- select appropriate routing algorithms for different network environments

REFERENCES

1. Carlos De MoraisCordeiro, Dharma PrakashAgrawal, "Ad Hoc and Sensor Networks: Theory and Applications", Second Edition, World Scientific Publishing, 2011.
2. Holger Karl, Andreas willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, Inc .2005.
3. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
4. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
5. ErdalÇayırcı , ChunmingRong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009

Mapping of Courses Outcomes with Programme Outcomes: **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**														
COs	**Programme Outcomes (POs)**													
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CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	3	2	3	3	-	-	-	-	-	-	2	2	2
CO3	2	2	3	2	2	-	-	-	-		2	1	2	3
CO4	1	3	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	2	2	-	-	-	3	-	-	-	2	1	3

MC7013 **SEMANTIC WEB** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the need of semantic web in web services
- know the methods to discover, classify and build ontology for more reasonable results in searching
- learn structuring and describing web resources
- build and implement a small ontology that is semantically descriptive of chosen problem domain
- implement applications that can access, use and manipulate the ontology

UNIT I INTRODUCTION **9**

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies – Contrasting Semantic with Conventional Technologies –Semantic Modeling Potential of semantic web solutions and challenges of adoption

UNIT II ONTOLOGICAL ENGINEERING **9**

Ontologies – Taxonomies –Topic Maps – Classifying Ontologies – Terminological aspects: concepts, terms, relations between them–Complex Objects–Subclasses and Sub-properties definitions–Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

UNIT III STRUCTURING AND DESCRIBING WEB RESOURCES **9**

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing – RDF – RDF Data Model–Serialization Formats-RDF Vocabulary–Inferencing-RDFS–basic Idea– Classes – Properties - Utility Properties – RDFS Modeling for Combinations and Patterns- Transitivity

UNIT IV WEB ONTOLOGY LANGUAGE **9**

OWL–Sub-Languages–Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

UNIT V SEMANTIC WEB TOOLS AND APPLICATIONS **9**

Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Wikis - Semantic Web Services – Modeling and aggregating social network data - Ontological representation of social relationships, Aggregating and reasoning with social network data

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand semantic web basics, architecture and technologies
- represent data from a chosen problem in in appropriate semantic tags
- analyze web serrvices
- understand the semantic relationships among these data elements using Resource Description Framework (RDF)
- design and implement a web services application that “discovers” the data and/or other web services via the semantic web

REFERENCES

1. Liyang Yu, “A Developer's Guide to the Semantic Web”, Springer, First Edition, 2011
2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez, “Semantic Web Programming”, Wiley, First Edition, 2009
3. Grigoris Antoniou, Frank van Harmelen, “A Semantic Web Primer”, Second Edition (Cooperative Information Systems) (Hardcover), MIT Press, 2008
4. Robert M. Colomb, “Ontology and the Semantic Web”, Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press, 2007.
5. Dean Allemang and James Hendler, “Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Morgan Kaufmann”, Second Edition, 2011.

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CO1	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO2	2	2	2	2	2	-	-	-	-		2	1	1	3
CO3	2	1	2	2	-	-	-	2	-	-	-	-	3	2
CO4	1	2	1	2	-	-	-	2	-	-	-	2	2	2
CO5	1	2	2	2	3	-	-	-	-	-	-	2	1	2

MC7014 SOFTWARE TESTING AND QUALITY ASSURANCE 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- know the behavior of the testing techniques to detect the errors in the software
- understand standard principles to check the occurrence of defects and its removal
- know the behavior of testing responsibilities
- learn the functionality of automated testing tools
- understand the models of software reliability

UNIT I TESTIING ENVIRONMENT AND TEST PROCESSES 9

World - Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis

UNIT II TESTING TECHNIQUES AND LEVELS OFTESTING 9

Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing – Integration Testing - Defect Bash Elimination. System Testing-Usability and Accessibility Testing–Configuration Testing -Compatibility Testing – Case study for White box testing and Black box testing techniques.

UNIT III INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES 9

Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT IV TEST AUTOMATION 9

Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

UNIT V SOFTWARE TESTING AND QUALITY METRICS 9

Testing Software System Security- Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA – Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object-Oriented Metrics.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- test the software by applying testing techniques to deliver a product free from bugs
- evaluate the web applications using bug tracking tools
- understand the technology tools that can reduce paper waste and carbon footprint by user
- explore the test automation concepts and tools

REFERENCES

1. William Perry, "Effective Methods of Software Testing", Third Edition, Wiley Publishing 2007
2. SrinivasanDesikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education
3. NareshChauhan , "Software Testing Principles and Practices " Oxford University Press , New Delhi , 2010.
4. Dale H. Besterfiled et al., "Total Quality Management", Pearson Education Asia, Third Edition, Indian Reprint (2006).
5. Stephen Kan, "Metrics and Models in Software Quality", Addison – Wesley, Second Edition,2004

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CO4	1	2	2	1	-	-	-	2	-	-	-	-	2	2
CO5	2	3	2	1	-	-	-	1	-	-	-	3	2	3

MC7015 SOFTWARE PROJECT MANAGEMENT 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- know of how to do project planning for the software process
- learn the cost estimation techniques during the analysis of the project
- understand the quality concepts for ensuring the functionality of the software
- understand the knowledge and skills needed for the construction of highly reliable software project
- understand to create reliable, replicable cost estimation that links to the requirements of project planning and managing

UNIT I SOFTWARE PROJECT MANAGEMENT CONCEPTS 9

Introduction to Software Project Management: An Overview of Project Planning: Select Project, Identifying Project scope and objectives, infrastructure, project products and Characteristics. Estimate efforts, Identify activity risks, and Allocate resources.

UNIT II SOFTWARE EVALUATION AND COSTING 9

Project Evaluation: Strategic Assessment, Technical Assessment, cost-benefit analysis, Cash flow forecasting, Cost - benefit evaluation techniques, Risk Evaluation. Selection of Appropriate Project approach: Choosing Technologies, choice of process models, Structured methods.

UNIT III SOFTWARE ESTIMATION TECHNIQUES 9

Software Effort Estimation: Problems with over and under estimations, Basis of software Estimation, Software estimation techniques, expert Judgment, Estimating by analogy. Activity Planning: Project schedules, projects and activities, sequencing and scheduling Activities, networks planning models, formulating a network model.

UNIT IV RISK MANAGEMENT 9

Risk Management: Nature of Risk, Managing Risk, Risk Identification and Analysis, Reducing the Risk. Resource Allocation: Scheduling resources, Critical Paths, Cost scheduling, Monitoring and Control: Creating Framework, cost monitoring, prioritizing monitoring.

UNIT V SOFTWARE QUALITY MANAGEMENT 9

TQM, Six Sigma, Software Quality: defining software quality, ISO9126, External Standards, Comparison of Project management software's: dot Project, Launch pad, OpenProject. Case study:PRINCE2

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- understand the activities during the project scheduling of any software application
- learn the risk management activities and the resource allocation for the projects
- can apply the software estimation and recent quality standards for evaluation of the software projects
- acquire knowledge and skills needed for the construction of highly reliable software project
- able to create reliable, replicable cost estimation that links to the requirements of project planning

REFERENCES

1. Bob Hughes & Mike Cotterell, “Software Project Management”, Tata McGraw- Hill Publications, Fifth Edition 2012.
2. S. A. Kelkar,” Software Project Management” PHI, New Delhi, Third Edition, 2013.
3. Richard H.Thayer “Software Engineering Project Management,”: IEEE Computer Society
4. Futrell , “Quality Software Project Management”, Pearson Education India, 2012
5. Bob Hughes & Mike Cotterell, “Software Project Management”, Tata McGraw- Hill Publications, Fifth Edition 2012.
6. S. A. Kelkar,” Software Project Management” PHI, New Delhi, Third Edition, 2013.
7. Richard H.Thayer “Software Engineering Project Management,”: IEEE Computer Society
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CO4	2	3	1	2	1	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

MC7016 **CLOUD COMPUTING** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- introduce the broad perceptive of cloud architecture and model to understand the concept of Virtualization and design of cloud Services to be familiar with the lead players in cloud.
- understand the features of cloud simulator
- apply different cloud programming model as per need
- learn to design the trusted cloud Computing system
- address the core issues of cloud computing such as security, privacy and interoperability

UNIT I CLOUD ARCHITECTURE AND MODEL **9**

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IAAS, PAAS, SAAS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II VIRTUALIZATION **9**

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization – Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-centre Automation.

UNIT III CLOUD INFRASTRUCTURE **9**

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV PROGRAMMING MODEL **9**

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V SECURITY IN THE CLOUD **9**

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- compare the strengths and limitations of cloud computing
- identify the architecture, infrastructure and delivery models of cloud computing
- apply suitable virtualization concept
- choose the appropriate cloud player, Programming Models and approach
- design Cloud Services and Set a private cloud

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management and Security", CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India, 2011.
5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly

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CO3	1	2	2	3	3	-	1	-	-		2	2	1	2
CO4	2	1	2	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	2	1	-	-	-	2	-	-	-	3	2	2

MC7017 **NETWORK PROTOCOLS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the existing network architecture models and analyze the their performance
- understand the high speed network protocols and design issues
- learn gamin engine design
- learn Network Security Technologies and Protocols
- study various protocols in wireless LAN, MAN

UNIT I FUNDAMENTALS OF NETWORKING STANDARDS AND PROTOCOLS 9

Network Communication Architecture and Protocols- OSI Network Architecture seven Layers Model – Definition and Overview of TCP/IP Protocols -TCP/IP Four Layers Architecture Model - Other Network Architecture Models: IBM SNA.

UNIT II ROUTED AND ROUTING PROTOCOLS 9

Application Layer Protocols-Presentation Layer Protocols- Session Layer Protocols – Transport Layer Protocols - Network Layer Protocols - Data Link Layer Protocols - Routing Protocols - Multicasting Protocols - MPLS.

UNIT III GAMING ENGINE DESIGN 9

Overview of ISDN−Channels−User access– Protocols Network management requirements − Network monitoring − Network control − SNMP V_1, V_2 and V_3 − Concepts, MIBs − Implementation issues-RMON.

UNIT IV SECURITY AND TELEPHONY PROTOCOLS 9

Network Security Technologies and Protocols - AAA Protocols - Tunneling Protocols – Security Protocols- Private key encryption − Data encryption system, public key encryption − RSA – Elliptic curve cryptography− Authentication mechanisms−Web security -Secured Routing Protocols - IP telephony -Voice over IP and VOIP Protocols –Signaling Protocols- Media/CODEC.

UNIT V NETWORK ENVIRONMENTS AND PROTOCOLS 9

Wide Area Network and WAN Protocols - Frame relay - ATM - Broadband Access Protocols –PPP Protocols - Local Area Network and LAN Protocols - Ethernet Protocols - Virtual LAN Protocols - Wireless LAN Protocols - Metropolitan Area Network and MAN Protocol - Storage Area Network and SAN Protocols.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course the students would be able to

- study, analyze and design seven layers of protocols of wired and wireless networks
- design Cloud Services and Set a private cloud
- analyze design implementation issues
- design ISDN and Network Protocols
- implement the broadband access protocol

REFERENCES

1. Javvin, "Network Protocols" , Javvin Technologies Inc , second edition, 2005
2. William Stallings, "Cryptography and Network Security", PHI, 2000.
3. Mani Subramanian, "Network Management−Principles and Practices", Addison Wesley, 2000
4. William Stallings, "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, Addison Wesley, 1999
5. William Stallings, "Data and Computer Communications" 5th Edition, PHI, 1997.

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CO3	2	2	3	2	3	-	-	-	-		1	2	2	2
CO4	1	2	2	1	-	-	-	2	-	-	-	-	3	2
CO5	1	3	2	2	-	-	-	2	-	-	-	2	2	2